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Building & Highway Material Testing Laboratory

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JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/BBU/W.No.05/WMM/Gradation/2016-17 08.09.2016

GRADATION FOR WMM

Customer : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. B.B. Umesh,**
#385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.

Name of Work : Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016

Date of Testing : 08.09.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	95	95	1.9	98.1	95-100
22.4	1745	1840	36.80	63.20	60-80
11.2	950	2790	55.80	44.20	40-60
4.75	425	3215	64.30	35.70	25-40
2.36	675	3890	77.80	22.20	15-30
0.600	550	4440	88.80	11.20	8-22
0.075	385	4825	96.50	3.50	0-5

Note:

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Job No.: CTCE/BBMP/BBU/W.No.05/WMM/AIV/2016-17 08.09.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
Name of the Work	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	08.09.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	307	
4	Aggregate Impact value = percent fines	21.96	21.08	
	$100^* (W_2/W_1)\%$			21.52

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/BBU/W.No.05/WMM/S-T/2016-17 08.09.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
Name of Work	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	08.09.2016

Result : Flakiness Index = **12.74%**

Elongation Index = **13.96%**

Result : Combined Flakiness & Elongation index 26.70%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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T-2377

Job No.: CTCE/BBMP/BBU/W.No.05/CSR-09/142d/QB(BC)/2016-17 15.09.2016

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

* CUSTOMER	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
*NAME OF THE WORK	:	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	13.09.2016
DATE OF TESTING	:	15.09.2016

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	86	80 to 100
2	Softening point, °C	IS :1205 -1978 (RA-2009)	45	Min. 40
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	298	Min. 220

*Information is furnished by the Customer/Representative.

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Job No.: CTCE/BBMP/BBU/W.No.05/BC/AIV/2016-17 15.09.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
Name of the Work	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	15.09.2016

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	388	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	297	295	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.60	22.94	22.77

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/BBU/W.No.05/BC/Shape.T/2016-17 : 15.09.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
Name of Work	: Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 15.09.2016

Result : Flakiness Index = **11.74%**

Elongation Index = **13.69%**

Result : Combined Flakiness & Elongation index **25.43%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/BBU/W.No.05/BC/Stripping/2016-17 16.09.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
Name of the Work	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
Type of Mix	Bituminous Concrete
Date of Testing	16.09.2016

Type of binder : 80/100
Percentage of binder used : 5.00% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.00 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.4	3.30	96.70
2	3.3		
3	3.2		

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/BBU/W.No.05/BC/Sp_Wa/2016-17 16.09.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
Name of the Work	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
Type of Mix	Bituminous Concrete
Date of Testing	16.09.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2005	2006	2004	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1239	1238	1249	
4	Weight of saturated surface dry aggregate in air	W_3 g	2025	2026	2027	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	786	788	778	
6	Weight of oven dried aggregate	W_4 g	2010	2011	2009	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.557	2.552	2.582	2.564
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.607	2.602	2.643	2.617
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.75%	0.75%	0.90%	0.80%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%.

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Job No: CTCE/BBMP/BBU/W.No.05/BC/Bitumen/2016-17 16.09.2016

BITUMEN CONTENT DETERMINATION OF BITUMINOUS CONCRETE MIX

As per IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
NAME OF THE WORK	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
SAMPLE I/D	Pot holes filling to roads in Ward No.05
DATE OF TESTING	16.09.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	473.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	26.50
7. Bitumen content in %	5.20	5.30
8. Average	**5.25**	

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Job No: CTCE/BBMP/BBU/W.No.05/BC/Bitumen/2016-17 16.09.2016

BITUMEN CONTENT AFTER GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

As Per IS 2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
NAME OF THE WORK	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
SAMPLE I/D	Pot holes filling to roads in Ward No.05
DATE OF TESTING	16.09.2016

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	45.25	9.55	9.55	90.45	79-100
9.5	36.25	7.65	17.19	82.81	70-88
4.75	64.15	13.53	30.73	69.27	53-71
2.36	63.58	13.41	44.14	55.86	42-58
1.18	55.47	11.70	55.84	44.16	34-48
0.6	64.72	13.65	69.50	30.50	26-38
0.3	37.12	7.83	77.33	22.67	18-28
0.15	36.85	7.77	85.10	14.90	12-20
0.075	43.15	9.10	94.21	5.79	4-10

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	42.25	8.92	8.92	91.08	79-100
9.5	42.17	8.91	17.83	82.17	70-88
4.75	75.48	15.94	33.77	66.23	53-71
2.36	63.52	13.41	47.18	52.82	42-58
1.18	75.48	15.94	63.13	36.87	34-48
0.6	45.12	9.53	72.65	27.35	26-38
0.3	36.23	7.65	80.31	19.69	18-28
0.15	25.63	5.41	85.72	14.28	12-20
0.075	32.35	6.83	92.55	7.45	4-10

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Job No.: CTCE/BBMP/BBU/W.No.05/BC/Agg/2016-17 16.09.2016

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
Name of theWork	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	16.09.2016

Total Weight of Sample: **5350** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	615	11.50	11.50	88.50	79 - 100	
9.5	460	8.60	20.09	79.91	70 - 88	
4.75	610	11.40	31.50	68.50	53 - 71	
2.36	602	11.25	42.75	57.25	42 - 58	
1.18	645	12.06	54.80	45.20	34 - 48	
0.600	530	9.91	64.71	35.29	26 - 38	
0.300	565	10.56	75.27	24.73	18 - 28	
0.150	420	7.85	83.12	16.88	12 - 20	
0.075	490	9.16	92.28	7.72	4 - 10	

Total Weight of Sample: **5400** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	625	11.57	11.57	88.43	79 - 100	
9.5	480	8.89	20.46	79.54	70 - 88	
4.75	635	11.76	32.22	67.78	53 - 71	
2.36	550	10.19	42.41	57.59	42 - 58	
1.18	645	11.94	54.35	45.65	34 - 48	
0.600	550	10.19	64.54	35.46	26 - 38	
0.300	530	9.81	74.35	25.65	18 - 28	
0.150	485	8.98	83.33	16.67	12 - 20	
0.075	485	8.98	92.31	7.69	4 - 10	

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Job No.: CTCE/BBMP/BBU/W.No.05/BC/Stability/2016-17 16.09.2016

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple. Bettahalasur Village & (P), Bangalore - 57.
Name of Work	:	Pot hole filling and road patch work in Sampigehalli, Basavalingappanagara, Balaji Krupa Layout, MCECHS Layout, Telecom Layout and others areas in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/LOA/T-03/2016-17 Dated: 16.08.2016
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	16.09.2016

The results of the tests conducted on the bituminous concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.40	9.35	9 Kn (min)
2	Marshal flow, mm	3.15	3.30	2 – 4
3	Percent air voids in Mineral Aggregate	4.60	4.50	3 – 6
4	Voids in Compacted Mix	13.65	13.60	13 – 15
5	Percent Voids filled with Bitumen	70.15	73.10	65 - 75
6	Density, g/cc	2.27	2.26	--

Note:

⇒ This test report shall not be reproduced except in full, without written approval of the laboratory.

⇒ The results indicated above are based on the tests carried out on the samples received in the laboratory.

⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

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